REMARKS

At the outset, Applicants acknowledge with appreciation the indicated allowable subject matter of claim 37 and suggested amendment. Accordingly, the present application has been amended in a manner as suggested in the Official Action, and is now believed be in condition for allowance.

Status of the Claims

Claim 25 has been amended to include the allowable features of claim 37, as suggested in the Official Action.

Claim 50 also has been amended to include the allowable features of claim 37.

Claim 37 has been cancelled.

Claim 38 has also been cancelled without prejudice.

Claims 25-35, 39-44 and 50 remain pending.

No new matter has been added.

Claim Objections

Claim 38 was objected to for being of improper dependent form for not further limiting claim 25.

As the position of the Official Action appears to be that an "oxidizing agent" is dioxygen, water vapor, organic oxidizing agents, and other non-organic oxidizing agents,

claim 38 is cancelled for not further limiting the recited "oxidizing agent".

Claim Rejections-35 USC §103

Claims 25-35, 38-44 and 50 stand rejected under 35 U.S.C. §103(a) as being unpatentable over HYEON U.S. 2004/0247503 A1 (HYEON). This rejection is respectfully traversed for the reasons below.

HYEON teaches a method for the direct synthesis of metal oxide nanoparticles comprising the steps of:

- synthesizing monodisperse metal oxide nanoparticles by adding a metal precursor, an oxidant, and a surfactant to a solvent in one container to prepare a mixed solution followed by a heating process, and

- completing the formation of the metal oxide nanoparticles by adding a poor solvent followed by a centrifugation process. (See, e.g., paragraph [0017] and claim 16).

In particular, the only example of direct synthesis of metal oxide nanoparticles (paragraph [0059], example 6) discloses that the mixed solution is heated to 300°C in order to thermally decompose iron pentacarbonyl.

Specifically, HYEON discloses a nucleation procedure carried out by a thermal decomposition near the reflux temperature of the solvent. For this reason, the solvents used

in HYEON's process should have high boiling temperatures close to the thermal decomposition temperature of the metal surfactant complex (as described in paragraph [0025]).

Furthermore, this method has the disadvantage of producing numerous by-products that should be removed by three or more repeated washing processes.

In contrast, the claimed process involves the preparation of a composition of nanoparticles of crystalline metal oxide wherein a liquid solution of organometallic precursor is formed, and the liquid solution is brought into contact with at least one oxidizing agent at ambient temperature wherein the process does not involve thermal treatment to produce said nanoparticles of crystalline metal oxides (amended claim 25). Moreover, the claimed process presents the advantage of being clean and not requiring a further washing process.

Metallic oxides being not prone to crystalline coalescence and growth phenomenon, it was completely unforeseeable to obtain crystalline metal oxide nanoparticles by the claimed process in such mild conditions (see paragraphs [0037] to [0040] of the specification).

Such mild conditions were not suggested by HYEON, in contrast with the arguments of the Official Action refer to paragraph [0027]. Indeed, in paragraph [0027], HYEON discloses that the reaction of a metal precursor and a surfactant can be

performed at room temperature or lower, leading to a metal surfactant complex. However, this paragraph does not disclose such mild condition to obtain metal oxide nanoparticles.

Accordingly, nothing in HYEON would have led the skilled artisan to achieve the claimed process for preparing nanoparticles of crystalline metal oxide.

Indeed, the Official Action acknowledged, "HYEON alone or in combination does not teach or suggest a process that does not involve a thermal treatment (i.e. heating) to produce the nanoparticle of crystalline metal oxides as recited in claim 37".

Thus, as both independent claims 25 and 50 recite this feature, HYEON alone fails to render obvious these claims, and dependent claim s 26-35 and 39-44.

Claim Rejections-35 USC §102/103

Claims 25, 38, 40, 42 and 44 were rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over FAU et al. U.S. 6,395,053 B1 (FAU). This rejection is respectfully traversed for the reasons below.

FAU describes a method of forming a metal colloid comprising the steps of:

- providing an organometallic precursor comprising the metal;

- combining the organometallic precursor and a solvent, the solvent comprising water molecules;
- heating the combination of organometallic precursor and solvent so that the organometallic precursor decomposes to form a solution including the metal colloid and by-products wherein the decomposition of the organometallic precursor is performed without the aid of a reducing agent; and
- removing the by-products to provide the metal colloid.

More specifically, this document discloses a method of forming a metal colloid, that is to say, a suspension of metal particles. This method involves the decomposition of an organometallic precursor (for example $[Sn(N(CH_3)_2)_2]_2$) in a solvent containing water by heating (at temperatures about 100 to 160°C) and under an inert gas (such as argon) (Col. 2, lines 59-64).

However, FAU does not disclose nor suggest a process for the preparation of nanoparticles of crystalline metal oxide wherein a liquid solution of organometallic precursor is formed, and the liquid solution is brought into contact with at least one oxidizing agent at ambient temperature, wherein the process does not involve thermal treatment to produce said nanoparticles of crystalline metal oxides.

Furthermore, in contrast with the remark made in the Official Action, FAU teaches that steps 1, 2, 3 and 4 take place in an inert gas, that is to say, a gas that does not interfere with the reaction, i.e., the reaction should not take place in an oxidizing gas (Col. 3, lines 54-58). FAU only discloses that, once the tin colloid was obtained, it can be stored under air.

FAU also discloses that the obtained tin particles can be oxidized into tin oxide by thermal treatment (Col. 4, lines 35-37). So, FAU does not disclose a process for the direct preparation of metal oxide nanoparticles. The process described by FAU requires numerous steps to obtain metal oxide nanoparticles and thermal treatment.

Accordingly, as amended claim 25 recites that the process does not involve a thermal treatment to produce nanoparticles of crystalline metal oxides, neither claim 25 nor dependent claims 38, 40, 42 and 44 are anticipated by or rendered obvious over FAU.

Therefore, withdrawal of the rejection is respectfully requested.

Furthermore, even if one were to combine the teachings of FAU and HYEON, FAU fails to cure the deficiencies of HYEON for reference purposes. Accordingly the combination would not have led the skilled artisan to achieve the claimed subject matter.

Therefore, 25-36, 39-44 and 50 are also considered unobvious over the combination of FAU and HYEON.

Conclusion

In view of the amendment to the claims and the foregoing remarks, this application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis is respectfully requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to our credit card which is being paid online simultaneously herewith for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON

/Robert A. Madsen/
Robert A. Madsen, Reg. No. 58,543
209 Madison Street, Suite 500
Alexandria, VA 22314
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

RAM/fb